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THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS ***US60/673,506***

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PATENT

Attorney's Docket No. 16-812

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

The Honorable Assistant Commissioner for Patents
BOX PROVISIONAL APPLICATION
Washington, D.C. 20231

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 C.F.R. § 1.53(b)(2).

INVENTOR(s)/APPLICANT(s)

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TITLE OF THE INVENTION (280 characters max)

PNEUMATIC AIR DAM SYSTEM

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ENCLOSED APPLICATION PARTS *(check all that apply)*

Specification *Number of Pages*	2	XX Applicant is a Small Entity
Drawing(s) *Number of Sheets*	3	Other *(specify)* ___

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION *(check one)*

☒ A check is enclosed to cover the filing fees	FILING FEE AMOUNT(S) $ 100.00
☒ The Commissioner is hereby authorized to charge additional filing fees and credit Deposit Account No. 23-0630	

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government. ☒ NO.

Respectfully submitted,

SIGNATURE: ___ DATE: 21AP05
JENNIFER NOCK HINTON
Reg. No. 47,653

Express Mail No. EV172214476US
I hereby certify that this paper is being deposited with the U.S. Postal Service as Express Mail to the Assistant Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450
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Pneumatic Air Dam System – "PADS"

Roderick M Dayton
April 7, 2005

The Pneumatic Air Dam System, herein referred to as "PADS", is a device intended to reduce aerodynamic drag through altering the path of airflow under and/or immediately around a vehicle. The device may be designed into future production vehicles or added to an existing vehicle as a retrofit device. While targeted to the "over the road" Class 8 truck market, the device is equally applicable to virtually all modes of ground transportation. The principle effect of the device is to reduce drag and generate a corresponding increase in fuel efficiency.

The "PADS" consists of multiple individually inflated structures in various geometric forms having cross sectional shapes such as circles, ovals, rectangles, and trapezoids and a height of sufficient length. These structures are herein referred to as "Cells", and for example purposes, consider circular cross section Cells of approximate four inches diameter by nine inches tall. When placing multiple Cells together with each Cell's long edge abutted to the next Cell's long edge, they form a continuous barrier. Figure 1 provides an overall view of the cells installed on a class 8 truck. Figures 2 and 3 display a side and bottom views with cells aligned in a typical orientation. Figures 4 and 5 show a single cell inflated and deflated and define the typical structure of the cell.

Each Cell consists of a combination of materials such as an internal inflatable bladder (see figures 4 and 5, material marked A) inserted into a flexible impact resistant sheath (see figures 4 and 5, material marked B). When the bladder is pressurized with high pressure air, the Cell becomes effectively rigid to the extent that the Cell will not deflect under the pressure of air moving at velocities typically encountered in a vehicle traveling on a paved surface, yet significant impact can cause the Cell to deflect, such as when the Cell makes contact with debris on the paved surface over which the vehicle is traveling. In such an impact situation, the Cell, upon removal of the deflecting force, returns to its pre-deflected state and position. When the "PADS" is not activated, the deflated cells are lifted up toward the undercarriage of the truck such that the deflated cell is removed from general sight and impact. A spring steel wire is contained in the sleeve (see figures 4 and 5, material marked C) to provide a retracting force to lift the deflated cell when the "PADS" is not activated. The spring steel lifting force is overcome when the system is active.

In practice, the Cells are suspended from the underside of a vehicle carriage such that, for example, the four inch diameter sections are attached to the undercarriage and the nine inch lengths extend down toward the ground. Figures 1, 2, and 3 display side and bottom views of a class 8 truck with cells aligned in a typical orientation. When aligned in this manner, the Cells form a barrier blocking the primary flow of air under and/or immediately around the vehicle. Figure 2 shows a side view of the cells installed on a vehicle with letter A indicating the cells positioned along the front of the vehicle, B indicating cells located under the carriage, and C indicating the air gap filled by the cells when inflated. Figure 3 shows the typical spatial placement left to right and the resultant air path blockage created by the inflation of the cells. Blocking the primary flow of air under the vehicle causes a reduction in the drag created by air

turbulence under the carriage of the vehicle and has the resultant effect of improving fuel efficiency.

Specific unique attributes: The "PADS" structure is unique compared to other devices used to create a similar effect in the following ways: The method of pneumatic actuation is unique. The method of providing impact resistance is unique. The location and shape of the installation on the vehicle, herein referred to as the "Air Bullet", between the front and rear axles as Shown in figures 2 and 3 and marked as B, as well as the combination of this dam and the dam located at the front of the vehicle, marked A in figures 2 and 3 is unique. Another unique aspect is that the "PADS" Cells may be placed around the perimeter of the entire vehicle and may also be incorporated on the trailer.

While the concept of air dams is not new, this system is unique in the method of creating the air dam. Further, the system is actuated such that it is capable of being turned on and off and moved in and out of position while the vehicle is in motion, it is impact resistant such that impacts are absorbed and the Cells reset themselves to optimal position, and the system may be used around the entire periphery, in selected peripheral areas, and/or located on the undercarriage of the vehicle not only along the front of the vehicle where other fixed air dams have none of these advantages. When placed in the undercarriage "Air Bullet" position, typical view shown in Figure 1, the "PADS" has the additional benefit of being less visually intrusive to the design of the vehicle.

Figure 3 shows the typical "PADS" locations. The "PADS" can be positioned at location A, location B, locations A and B, and around the entire periphery of the vehicle, and any combination or subsections of these locations with varying levels of air flow restriction. The "PADS" may also be located around the front of a trailer, around the entire trailer, and any combination or subsections of these locations, again, with varying levels of air flow restriction.

Figure 4 shows an inflated cell and its basic components: the impact resistant sleeve; the inflatable bladder, which resides within, and is restrained by, the sleeve; and the spring steel wire. Figure 5 shows a deflated cell in its home, curled upward, position. The upward curl is caused by the spring steel wire, which in its natural state is bent into a "U" shape. Figure 4 and 5 show side views of a cell. The sleeve (figures 4 and 5, material marked B) has additional lengths of material in the front and back of the cell. The extra sleeve material is permanently sandwiched between two malleable strips, typically formed of metal, in the front and back of the cell diameter, 180 degrees apart. The malleable strip has mounting tabs (see figures 4 and 5, material marked D) where the malleable strip is to be mounted to the carriage of the vehicle. Each malleable strip consists of multiple cells mounted side by side, the number of cells being determined by the spatial coverage required.

The cells are made rigid pneumatically. Utilizing high pressure, low volume air, cells are interconnected by small diameter pneumatic tubing (see figures 4 and 5, material marked E). Typically, no more than four cells will be interconnected minimizing the potential for complete loss of air pressure should one cell malfunction. The Malleable strips are designed to be modular such that strips may be replaced as needed or placed individually for location optimization.

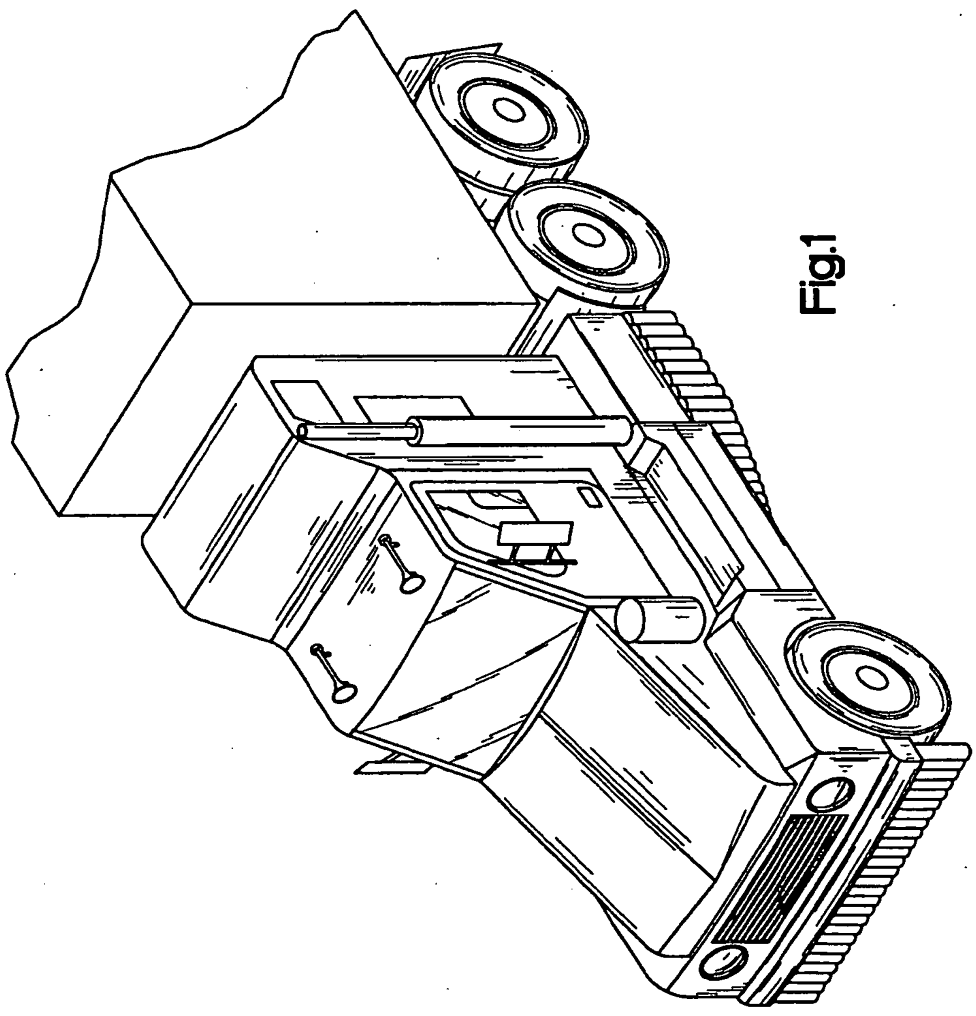

Fig.1

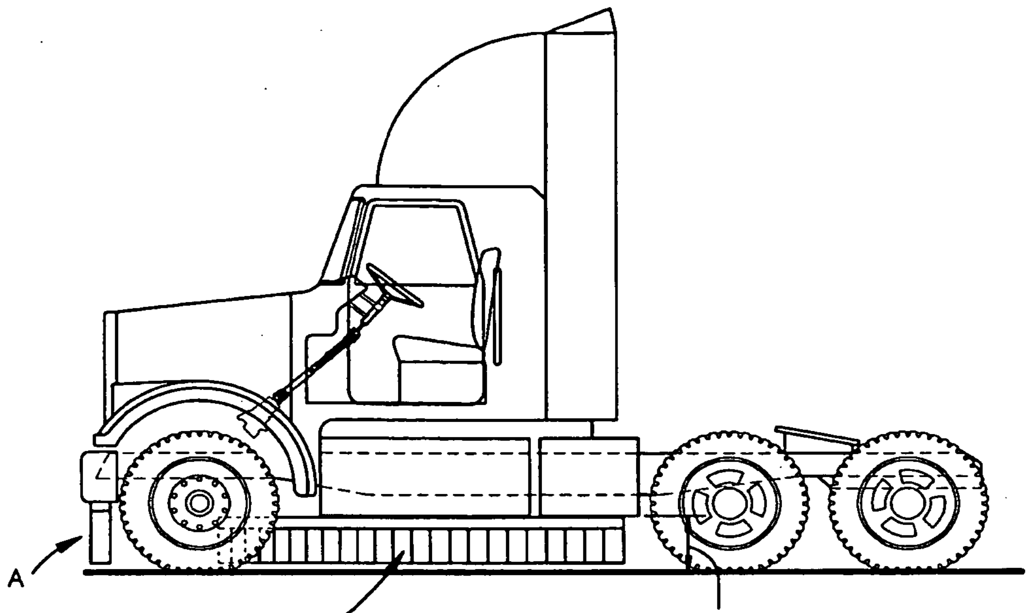

Fig.2

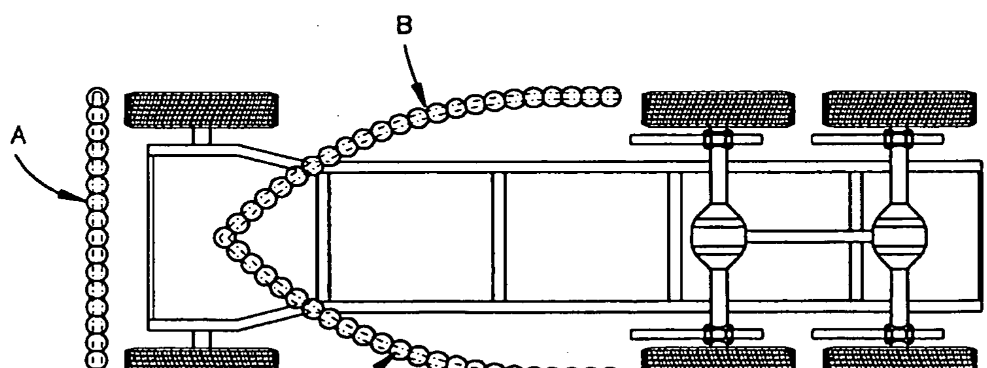

Fig.3

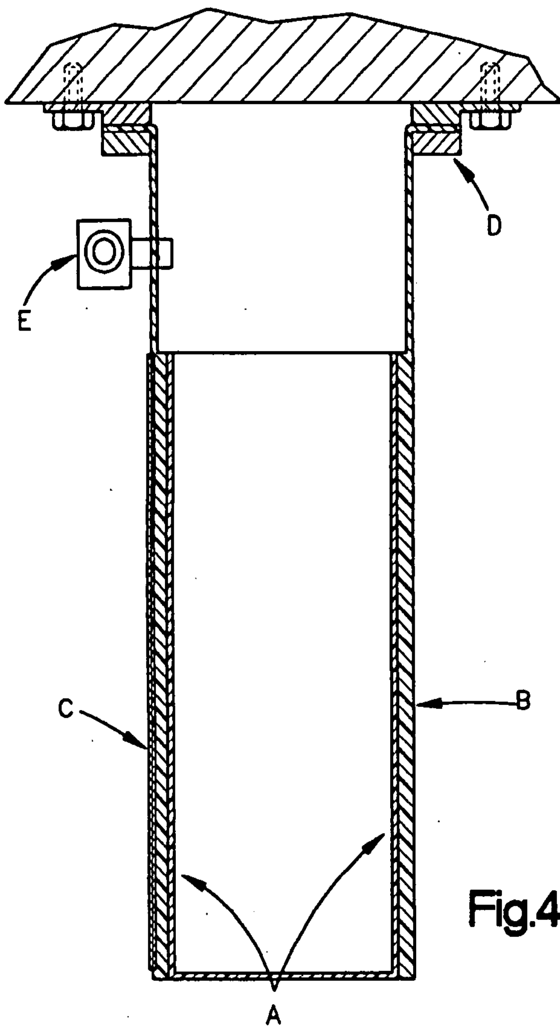

Fig.4

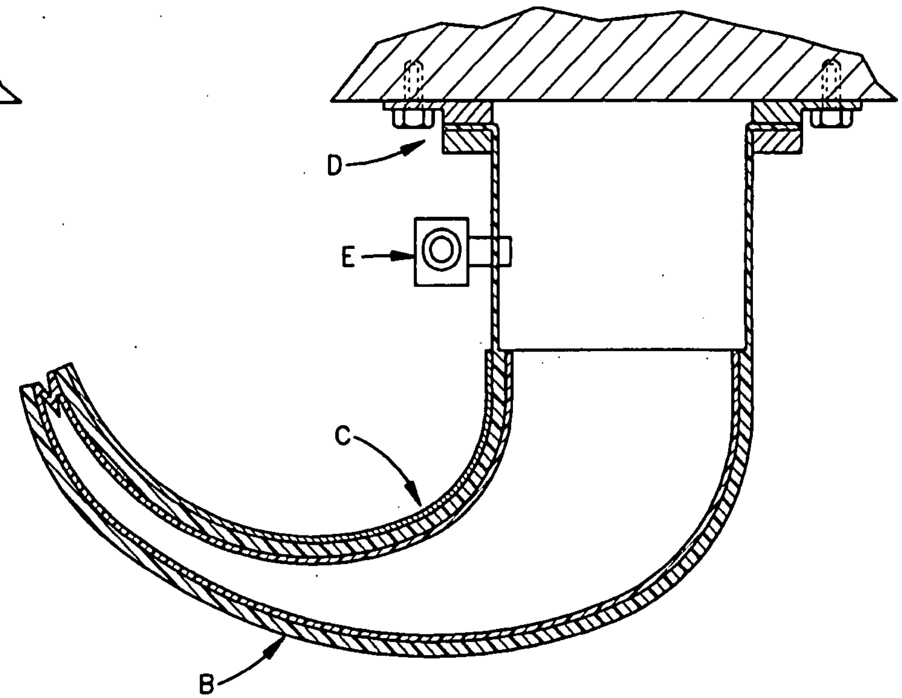

Fig.5